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The Reversal of the Gender Gap in Education and Female Breadwinners in Europe

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Abstract:

While men have historically attained more education than women around the world, this gender imbalance in education has reversed in many countries. In these countries, the wife now typically has as much or more education as the husband, while it has always been the other way around in the past. Using the 2007 and 2011 rounds of the EU-SILC (N=95,498 for 27 countries), this paper investigates to what extent the newly emerging pattern of educational assortative mating is associated with a higher proportion of women who out-earn their partners in Europe. We find that this proportion varies on the country level between 20% and almost 50% for childless women and between 3 and 25% for women with toddlers. If a woman has more education than her partner, this clearly increases the odds that she earns more than half of the couple income. This happens to such an extent that it may offset the motherhood penalty: college educated mothers of school age children with a less educated partner are as likely to be the main breadwinner as college educated women without children but with a college educated man. However, large country heterogeneity remains that cannot be explained by educational pairings.

Keywords: Gender; gender roles; income; Labour force participation; gender pay gap; motherhood penalty; education; educational assortative mating

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Contents

| | |
|---|-----------|
| 1 Introduction | 2 |
| 2 Male and female breadwinners | 4 |
| 2.1 Educational assortative mating | 4 |
| 2.2 Gender and paid labor | 6 |
| 2.3 Motherhood and relative income | 8 |
| 2.4 Research questions | 10 |
| 3 Data and methods | 11 |
| 4 Results | 16 |
| 4.1 Descriptive findings | 16 |
| 4.2 Model results | 21 |
| 5 Conclusion and discussion | 26 |
| References | 31 |

1 Introduction

University colleges largely remained a male domain until well into the second half of the twentieth century. Male enrollment and completion rates in advanced education were higher than female rates virtually everywhere. Since the 1990s, however, there are more women than men enrolled in higher education worldwide (Schofer and Meyer 2005). In many countries in different regions of the world, women are now outnumbering men in college level education and they are also graduating more successfully (Lutz, Cuaresma, and Sanderson 2008; Vincent-Lancrin 2008).

The reversal of the gender gap in education implies that in many countries, for the first time in history, there are more highly educated women than highly educated men reaching the age of partnering and parenthood. This is affecting age-old patterns of assortative mating. Traditionally, women tended to marry men who were at least as highly educated as themselves while men tended to marry women who were often less educated. This pattern is no longer compatible with the distribution by age, sex, and education on the marriage market (Van Bavel 2012). A recent study has shown that the reversal of gender inequality has indeed undermined the traditional pattern of educational hypergamy (women marrying up) and that hypogamy (women marrying down) has become more prevalent (Esteve, García-Román, and Permanyer 2012).

Changing patterns of educational assortative mating are expected to affect family formation, including the timing and quantum of marriage, divorce, and fertility (Van Bavel 2012; Schwartz and Han 2014). A major reason for this is that a switch from hypergamy to hypogamy is likely to affect who is the main breadwinner in the family: if the wife is higher educated than the husband, she may have a higher earning potential in the paid labor market. In turn, this may affect the decision-making processes related to his and her labor market participation and to the timing and quantum of fertility.

Yet, the reversal of gender inequality in education need not necessarily lead to a reversal in the gender pay gap. There are several reasons why a gender pay gap to the disadvantage of women may persist (Arulampalam, Booth, and Bryan 2007; Christofides, Polycarpou, and Vrachimis 2013; Bettio et al. 2013). One of them is that, in education, the choice of study subject remains strongly gender-biased. For example, women are more likely to study subjects related to health, teaching, and the service sector; men are more likely to choose sectors that yield higher salaries, like engineering and business economics (Machin and Puhani 2003; Chevalier 2007). Another reason is the persistence of a “motherhood

penalty”: women scale down their paid labor market activity much more than their male partners do when they are having children. As a result, men continue to be the main breadwinners particularly in families with children (McDonald 2000; 2006; Budig and England 2001; Budig, Misra, and Boeckmann 2012).

To date, recent patterns of women’s earnings compared to their partners’ have been analyzed only for a few Western countries. In the United States, about 20–25% of dual-earner couples belonged to a group where the woman was out-earning her male partner in the 1990s (Winkler 1998; Winkler, McBride, and Andrews 2005). This proportion has been on the rise in recent years. Married women are increasingly more educated than their husbands in the US and their position as the main earner is supported by a growing acceptance of female breadwinning (Wang, Parker, and Taylor 2013). In Canada, the proportion of dual-earner couples with the wife as the primary breadwinner stood at 25% in the beginning of the 1990s, up from around 19% in the 1980s (Sussman and Bonnell 2006). An Australian study showed that a considerable proportion of breadwinner wives held this position only temporarily, as a result of a temporary dip in their partners’ income (Drago, Black, and Wooden 2005). In France, Bloemen and Stanca (2008) found that in almost a fifth of dual-earner households the wife earned more than her husband in the early 2000s. There are no similar studies drawing the picture across European countries. So, it remains to be seen how the recent reversal of gender equality in education across Europe and the related changes in spouses’ educational pairings affect his and her relative earnings across European countries.

Given the shift from female educational hypergamy to hypogamy, this paper investigates to what extent this new pattern of educational pairing is associated with a higher share of female breadwinners. We draw on the European Union’s Survey on Income and Living Conditions (EU-SILC) to calculate the share of women’s contribution to the household budget, counting only individual income earned with paid work and self-employment. First, we describe the variation across 27 European countries in terms of women’s shares in the household income, comparing those with and without children. Second, we model how educational pairings are associated with the probability that she is the main breadwinner compared to the probability that she is either almost completely dependent on his income or is earning a substantial part but less than half. Given the fact that the financial and economic crisis after 2008 has affected the economic situation of men and women differently (Bettio et al. 2013), we look both at the situation before and in the wake of the crisis, namely in 2007 and 2011.

The next section further develops our research question by reviewing the literature about three aspects that are central to this paper: educational assortative mating, women's labor market activity, and the motherhood penalty. After detailing the data and methods used, we first present descriptive results about patterns of educational pairings and women's share in the couple income across countries. Next, we present the results from the multilevel models about how educational pairings affect relative earnings within cohabiting couples, including both married and unmarried ones. Our main finding is that the emerging pattern of educational hypogamy clearly increases the odds that the woman is the main breadwinner. This happens to such an extent that it is offsetting the motherhood penalty.

2 Male and female breadwinners

The concept of “the breadwinner” is extensively used in the literature about the relative contribution of male and female partners to the household budget to refer to who earns most of the income in the paid labor market (Warren 2007). Given that in most cases this is the husband, it has become common practice to talk about the male breadwinner. The male breadwinner – female homemaker family model refers to the situation where he earns (almost) all the income and she spends most of the time doing childcare and household chores at home. In contrast to this, the dual-earner model refers to families where both partners earn more or less an equal share of the family income, say in the range of 40 to 60% (Nock 2001; Raley, Mattingly, and Bianchi 2006).

The focus of this paper is on what Heckert, Nowak, and Snyder (1998) call “nontraditional” types of families, namely when she earns more than half of the income, and “reverse traditional” couples, where she earns almost all of the income, i.e. the mirror image of the male breadwinner – female homemaker model. The next sections review the relevant literature along three dimensions of the issue. First, we discuss the role played by educational assortative mating in the marriage market, second we highlight key insights from the vast literature about women's labor market activity and, third, we summarize findings on the motherhood penalty, i.e. the negative effect of motherhood on income.

2.1 Educational assortative mating

Differences between the relative contributions of spouses to the household budget are partly driven by educational assortative mating, not just in terms of level of attainment but also in terms of field of study (engineering or psychology, for example). The traditional male

breadwinner model was linked with a male advantage in education and a pattern of educational hypergamy (women marrying up in terms of education). With the expansion of female participation in college level education, homogamy has become the modal marriage pattern in most Western countries over the course of the 20th century (Mare 1991; Blossfeld 2009; Schwartz 2013). As female labor force participation increases and dual-earnship becomes common, high education and a high income potential become desirable features in the process of partner selection for women as well as for men (Oppenheimer 1994; Buss et al. 2001; Sweeney and Cancian 2004).

In the US, the proportion of educationally homogamous marriages increased monotonically since the 1960s until the end of the century (Mare 1991; Kalmijn 1991; Schwartz and Mare 2005). Studies across a wide range of industrial countries suggest that there may be an inverted U-shape relationship between the level of economic development and educational homogamy, the latter growing together with economic welfare first but giving way to more heterogamy at more advanced levels of economic development (Ultee and Luijkx 1990; Smits et al. 1998). Yet, at present, it is clear that cross-national trends do not neatly follow this pattern (Schwartz 2013).

Whatever the trends, educational homogamy is clearly the dominating pattern in contemporary union formation. It is expected that homogamous couples contribute more equally to their joint household budget than heterogamous couples, and homogamy tends to be highest among the highly educated (Blossfeld and Timm 2003; Blossfeld 2009; Buss et al. 2001; Skopek, Schulz, and Blossfeld 2011; Schwartz 2013).

When there are more highly educated women than men entering the marriage market, some women will have to either remain single or date a partner with less education (Van Bavel 2012), yielding more hypogamy instead of the traditional hypergamy (Esteve, García-Román, and Permanyer 2012). Although the basic hypothesis of the current paper is that hypogamy induces a higher proportion of matches where she is the main breadwinner, there are reasons to believe that such may not be the case. “Marrying down” runs against traditional gender roles, and US data about relative earnings suggest that unions where she earns more than him are still less common than could be expected given the reversal of gender inequality in education (Bertrand, Pan, and Kamenica 2013). Hypogamous partnerships need not necessarily result in wives earning more than husbands. In most countries gender pay gap is still quite persistent to the disadvantage of women, even at equal levels of education and labor market participation (Arulampalam, Booth, and Bryan 2007; Olivetti and Petrongolo 2008; Christofides, Polycarpou, and Vrachimis 2013). This persistence is related the women’s

choices of study subject and occupation, the degree of attachment to the labor market and how this connects with childbearing and –rearing, as will be discussed in the following sections.

2.2 Gender and paid labor

The relative contribution of partners to the couple income will depend directly on their activity in the paid labor market as well as on wage levels, which is expected to be affected by his and her education. While low educated single women would have to work more in order to gain an income compared to highly educated women in order to earn a living, the calculus changes within a couple context. For both men and women with low education, the gains from labor market activity and the opportunity costs of staying at home are relatively low; conversely, for those with more education, the gains from paid labor and the opportunity costs of staying at home are higher (Mincer 1963; Becker 1993).

Micro-economic theory states that this has implications for the gender division of labor. If both partners are low educated, the need for income will encourage employment in both partners, but low income potential and low opportunity costs of staying at home will discourage employment. In such cases, it is an empirical question whether the high need for income or the low opportunity costs will dominate for him and for her. Research in wealthy countries has typically found the opportunity cost effect predominating for women and the income effect for men (England 2010). This reflects the fact that women more often stay at home when they have children, since the costs of outsourcing childcare undermine the incentives for paid labor, particularly among low educated women. So, among low educated homogamous couples, she is expected to earn less income, all else equal, notably they have children.

Following the same logic of income effects and opportunity costs of his and her employment, hypergamous couples may find it economically even more beneficial than homogamous couples if he specializes in paid labor market activity and she specializes in homework and childcare (Becker 1985). The opposite might hold in case of hypogamy: when she is more highly educated than he, the income effect might dominate for her rather than for him and the opportunity cost of staying at home may be lower for him than for her. As a result, we would expect her to be the main breadwinner more often than in homogamous or hypergamous unions.

Along with their increased college completion rates, women's labor market participation as well as their wage levels have increased more than men's (Macunovich 1996;

Waldfoegel 1998; Thévenon 2013; Goldin 2004; 2006). In fact, Goldin, Katz and Kuziemko (2006) argue that this is one of the reasons for the reversal of gender inequality in education: the opportunities for women in the labor market and the pecuniary gains to education have increased more for women than for men. In many Western countries, labor demand has shifted towards sectors where women's skills are relatively highly valued, with a strong development of the service sector and a weakening of heavy industry. Even if women still earn less than men, the wage premium of college education has become greater for women than for men (Dougherty 2005), which has motivated women to invest more in their education (Goldin, Katz, and Kuziemko 2006).

These developments have been uneven across countries, however, and large country differences in female labor market activity remain that cannot be explained by micro-economic theory. While the gender gap in college completion has turned around to the advantage of women in virtually all Western countries, the gender gap in labor market activity has not followed suit. Varying gender regimes sustain gender inequality to varying degrees, but even in the most gender equal Scandinavian countries men's labor market activity is higher than in women's (Crompton and Harris 1998; Pascall and Lewis 2004; Lewis 1992). There are both institutional and cultural reasons for this – and the former often reflect the latter. Institutional reasons include policy arrangements that either facilitate or discourage women's participation in labor market through the tax system, childcare or labor market regulations (Lewis 1992; Anxo et al. 2007; Neyer and Andersson 2008; Thévenon 2011). Cultural reasons include beliefs and norms that underpin the male breadwinner – female homemaker family model (Janssens 1997; Pfau-Effinger 1998; Creighton 1999; Lewis 2001; Esping-Andersen 2009), like those related to gender roles. Cultural gender roles entail beliefs about how people that belong to the categories of “men” and “women” are supposed to behave and include such things as “men work best in the labor force and women work best in the home” and “a man should earn more than his wife” (Bertrand 2011: 1573). Bertrand, Pan, and Kamenica (2013) suggest that such beliefs imply an aversion against women earning more than their husbands and that women distort their labor supply so as to avoid a gender-role reversal in earnings. For example, they show that when the potential income of the wife, given her education, exceeds her husband's actual income, the wife reduces activity in the labor market (Bertrand, Pan, and Kamenica 2013). In OECD countries where people tend to hold more traditional attitudes towards gender roles, labor market activity of women has been found to be lower (Fortin 2005). Gender roles might also help explain why some life satisfaction studies have found that home-makers are often slightly happier than full-time

working women (Treas, van der Lippe, and Thai 2011), which may also support the argument about preferences of women to concentrate either on work career or on family life (Hakim 2003; Chevalier 2007).

Since beliefs and norms about gender roles vary by country, we should expect country variability in women's relative earnings, net of the effects of the spouses' educational pairing. Gender roles are particularly salient for labor market decisions made by couples with children, so it is the employment of mothers in particular that varies greatly between countries and regions (Anxo et al. 2007).

Activity in the labor market not only differs by country but also changes over time. Breadwinner status may be shifting between partners, for instance depending on the presence and age of children, or change in the long term as partners age (Winslow-Bowe 2006). Based on longitudinal data it was shown for Australia that many breadwinner women were in that position only temporarily (Drago, Black, and Wooden 2005). For Canada the longitudinal view suggests that about half of primary-earner wives are in this position in the long term (Sussman and Bonnell 2006).

Obviously, a change in the relative earning position may be due to a change in both her and his income. In this context, it is important to point out that the recent economic crisis in the wake of the 2008 financial crisis may be one reason for women becoming the main breadwinner. This may be the case when sectors where more men are employed (like heavy industry) are hit more by the crisis than sectors where women are more often employed (like education). Bettio et al. (2013) indicate that "[d]ual earner couples lost ground in the downturn almost exclusively to the advantage of female breadwinner couples that increased their share to almost 10%". Similarly, in the US, Chesley (2011) sees the decline of men's employment as a major factor explaining sole breadwinner women. In order to make sure that our findings about the role played by educational pairings are robust against the post 2008 economic shock, we included in this paper both a sample before and after 2008, as will be discussed in the data section.

2.3 Motherhood and relative income

Women with children earn less income, both compared to their husbands and compared to women without children. The presence of very young children in particular leads to lower involvement in the paid labor market and, hence, lower relative earnings (Budig and England 2001; Budig, Misra, and Boeckmann 2012). Depending on the context, reconciling children

with paid work become more or less viable when the youngest child reaches an age when there are more options for formal child care, including such things as Kindergartens, typically when the youngest child passes age 3.

The literature mentions several explanations for this motherhood penalty, involving both causal and selection effects (Budig and England 2001; Petersen, Penner, and Høgsnes 2010). The basic causal explanation is that childbirth usually implies some time away from the paid labor market: most women temporarily retreat from the labor market upon childbirth, resuming work again as the youngest child gets older (Stier, Lewin-Epstein, and Braun 2001; 2012; Budig, Misra, and Boeckmann 2012). Although the share of women returning to work after childbirth has increased in recent decades, many do so only part-time (OECD 2011), which depresses their earnings relative to their husbands and childless peers.

But even if they go back to work fulltime, the time off from employment negatively affects the wage level for various reasons, including the interruption of on-the-job human capital accumulation (Becker 1965; Waldfogel 1998; Joshi 2002; Anderson, Binder and Krause 2002), skill depreciation (Anderson, Binder and Krause 2002; Adserà 2004; Miller 2011), and negative signaling (Evertsson and Grunow 2012). In this context, the latter means that a person who is taking time off from work signals less work commitment to the employer than a peer who remained on the job (or has a shorter work interruption) (Evertsson and Grunow 2012). Given the importance of human capital in the types of job carried out by college educated women, the motherhood penalty due to a slowdown of human capital accumulation has been found to be stronger for highly than for low educated women (Anderson, Binder, and Krause 2002).

Next, the motherhood penalty may be caused by prejudice and (statistical) discrimination (Petersen, Penner, and Høgsnes 2010): women may suffer a motherhood penalty even before they actually have a child when employers already take into account presumed future absences due to potential childbearing. Experimental evidence suggests that this holds particularly for the most lucrative jobs (Correll, Benard, and Paik 2007), which again implies a higher motherhood penalty for college educated women than for women with less education.

Motherhood may also correlate negatively with earnings due to selection effects. In this case, it is not the presence of children as such which depresses women's earnings but rather that women who eventually have children earn lower wages even before they have children (Petersen, Penner, and Høgsnes 2010). In economics, this is often called the unobserved heterogeneity effect (e.g. Waldfogel 1998; Anderson, Binder, and Krause 2002). Women who

are more family-oriented may be opting out of competing for the more lucrative but highly time-consuming careers in order to spend more time with their children (Hakim 2003; Chevalier 2007; Lück and Hofäcker 2008). A Dutch study found that women in the Netherlands had a more positive attitude towards unpaid home work like cooking, cleaning, and child care than did men; women “enjoyed these tasks more, maintained higher standards, and felt more responsible for these tasks (Poortman and van der Lippe 2009). Even though preferences regarding career versus home have been found to cut across education levels, the proportion of career-oriented women is higher among the college educated than among women with less education. Conversely, lower educated women are more often home-centered than highly educated women (Hakim 2003; Chevalier 2007; Lück and Hofäcker 2008). However, it is unclear whether this educational gradient in stated lifestyle preference is due to the micro-economic considerations of opportunity costs, as discussed earlier.

The motherhood penalty varies a lot by country, depending on the structure of the labor market, policy measures, and cultural family models and gender role expectations (Stier, Lewin-Epstein, and Braun 2001; Harkness and Waldfogel 2003; Gutierrez-Domenech 2005; Neyer and Andersson 2008; Gangl and Ziefle 2009; Craig and Mullan 2010; Thévenon 2011; Budig, Misra, and Boeckmann 2012). For example, an aversion against bringing young children to formal childcare or the absence of childcare facilities will prolong career interruptions after childbearing, and the extent of such career breaks have been found to be an important source of the country heterogeneity in Europe (Davies and Pierre 2005; Molina and Montuenga 2009; Lundberg and Rose 2000). In Germany and the Netherlands, where the aversion against bringing young children to formal childcare is relatively high, the motherhood penalty is found to be particularly high, especially compared to Scandinavia (Sigle-Rushton and Waldfogel 2007).

2.4 Research questions

This paper will address three main research questions about women’s contribution to the couple income. The first is a simple descriptive question: how high is women’s average relative income and how is this distributed across European countries? Considering that the recent economic crisis might have had an impact on this, we look at the distribution both before and after 2008. Also, given that the male breadwinner – female homemaker norm stands strong in some countries more than in others, particularly when there are young

children, we compare the distribution of her average share to the household income obtained with and without taking into account women who are not active at all in the paid labor market.

The second research question is about the role of spouses' educational pairings: are women who are more highly educated than their partner also more likely to earn more than him, or do gender role expectations and the gender biased selection of study subjects and occupations prevent this from happening? In order to answer this question, we categorize the dependent variable (i.e., her relative income) to better reflect her economic position in the couple (following Heckert, Nowak, and Snyder 1998; Nock 2001; Raley, Mattingly, and Bianchi 2006; and Warren 2007).

The third question is about the differences between childless women and mothers, taking into account the difference between mothers of children who are typically too young to go to Kindergarten or school (younger than 4 years old), and older children. First, we describe differences between European countries in female breadwinning status depending on motherhood status and age of the youngest child. Next, using multinomial regression analysis, we investigate how educational pairings interact with these things. The central question here is: is the motherhood penalty on her relative earning position weakened in cases where her educational attainment is higher than his?

3 Data and methods

We use the European Union's Survey on Income and Living Conditions (EU-SILC), which is an annual household survey collecting both cross-sectional and longitudinal data on incomes and household's living conditions. In most countries, the survey uses a rotating panel design with a length of four waves. Each subsequent wave replaces part of the sample and the entire sample is renewed in four years (Atkinson and Marlier 2010). In this study we use cross-sectional data from 2007 and 2011 waves, which ensures that cross-sectional samples do not overlap. We choose only countries that are represented in both years since, as explained before, we want to be able to compare the situation before and after the 2008 financial and economic crisis. This makes for 27 countries in total (see Table 1) – Ireland, Malta and Switzerland are excluded because only one year is available for them.

From EU-SILC, we select women who are living with a partner at the time of the survey, either married or in unmarried cohabitation, and who are at least 25 and at most 45 years old. After excluding individuals with missing information, the size of the study sample is 95,498 women (50,746 in 2007 and 44,752 in 2011 respectively). Table 1 displays sample

sizes per country included, along with basic descriptive statistics of the main variables featuring in the analysis.

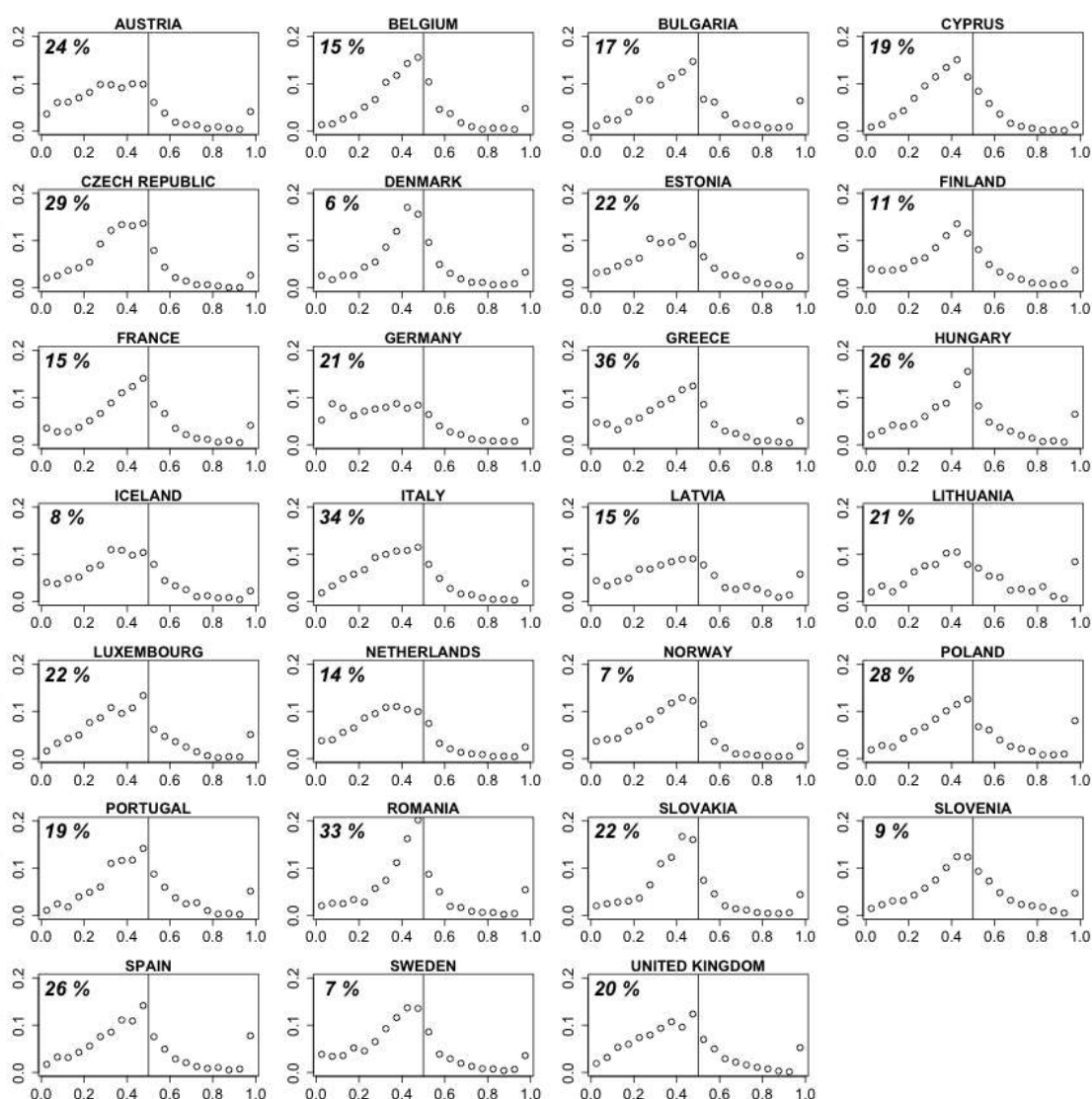
A woman's contribution to the couple income (which we will also denote by her "relative income" or her "share") is based on yearly gross income earned as an employee or through self-employment. To calculate her share, only couples where at least one member earned a positive income are included, excluding cases where none of both partners earned an income. Since we want to measure the relative income gained from individuals' economic activity, we choose to exclude transfers such as pensions, unemployment benefits, sick leave benefits, and family allowances. The income reference period is the year previous to the interview, so our income data are about earnings in 2006 and 2010, respectively.

The woman's share is the ratio of the woman's earnings to the sum of both partner's earnings, ranging from 0.0 to 1.0. In most countries, this variable has a local peak at 0.0 (the woman does not contribute any income), just before the 0.5 line of equal-earning couples, and a smaller final upturn at 1.0 (sole breadwinner women). Figure 1 depicts the frequency distribution of the woman's share in each country, with the exclusion of the proportion of couples where she earns no income at all. The reason for excluding this group from the graph is that in some countries the strong concentration of couples in this group dominates the picture so much that it would hide important patterns in other countries. We have therefore printed the percentage of couples where she earns no income separately in the upper left corner of each country panel. The percentages are particularly high (more than 25%) in Greece, Italy, and Spain as well as in Poland, the Czech Republic, Hungary, and Romania. Next, a notable feature of the distribution in most countries is "the cliff" at the 0.5 line: the distribution exhibits a sharp drop right at the point when the wife starts to earn more than the husband. Bertrand, Pan, and Kamenica (2013) make a similar observation for the US and interpret it as a sign that gender roles (called "gender identity" by the authors) imply that women and/or men avoid the situation where she is out-earning him. Women in couples who have crossed this 0.5 line are called female breadwinners in this paper.

We distinguish between women who earn no or just a small fraction of the couple income (0-10% of the couple income, called "dependent women"), women who earn a substantial part but less than half (11-50%), women who earn most but not all of the income (51-90%), and those who earn almost all income (91-100%). Taken into account that the latter group is very small, we merge them in the regression analysis with the penultimate category to form one group of "breadwinner women", which is the group of central interest in this paper.

We use multilevel multinomial logistic regression to model the probability that a woman is in the dependent (0-10%) or in the breadwinner category (51-100%) as opposed to being a contributing spouse (11-50%, i.e., the reference category). The primary purpose of the model is to test the effect of educational pairings and motherhood status and their interaction. We include country-level random intercepts in the central multinomial model (using Stata's *gllamm* module, see Rabe-Hesketh, Skrondal and Pickles 2004). From the model we predict probabilities of belonging to any of the outcome variable categories.

Figure1: Distribution of the woman's contribution to the couple income by country; percentage of couples where the woman gains no income is printed in the top left corner of each country panel



Source: EU-SILC 2007 and 2011, own calculations, sample weights, 2007 and 2011 data pooled.

The educational attainment of him and her are the central explanatory variables in this paper. They are indexed with the ISCED-97 scale, collapsed into three larger groups: low (ISCED levels 0–2, up to the second stage of basic education), medium (ISCED 3–4, secondary education or post-secondary but not tertiary) and high education (ISCED 5–6, tertiary and PhD level).

Motherhood status is the next key explanatory variable. EU-SILC lacks information about the number of children ever born, it only mentions which children are living in the same household as the respondents and their ages. Therefore, using the own child method, we are unable to identify mothers whose children have already left home (be it because they are old enough to live independently or because the parents have divorced and the child is living with the other parent). Hence, what we will capture in this paper is really the effect of having a child living at home, not the effect of parenthood per se. We distinguish between three categories: childless women, mothers whose youngest child is up to 3 years old, and mothers whose youngest child is at least 4 years old.

The regression analysis controls for woman's age, survey year, and the partner's employment. The man's employment is captured by two variables: whether or not he works usually at least 40 hours a week, and whether or not he has experienced at least a month of unemployment during the income reference period. Woman's own employment was not included because it would result in model overspecification. Finally, we also include a dummy for the survey year (indicating income year 2010; 2006 is the reference year). Table 1 gives basic, country-specific information about the distribution of each of the variables of central interest.

Table 1: Sample size and distribution of main variables by country

| Country | | Woman's education | | | Motherhood status | | | Educational pairing | | | Bread-winners | Mean age |
|-------------|------|-------------------|------|------|-------------------|----------------|---------------|---------------------|------------|-----------|---------------|----------|
| | | Low | Mid | High | Child-less | Child aged 1-3 | Child aged 4+ | homo-gamy | hyper-gamy | hypo-gamy | | |
| | N | % | % | % | % | % | % | % | % | % | % | years |
| Austria | 2933 | 17.0 | 61.8 | 21.2 | 20.3 | 24.3 | 55.4 | 64.2 | 22.6 | 13.2 | 15.7 | 36.2 |
| Belgium | 2595 | 8.7 | 37.6 | 53.7 | 26.9 | 27.1 | 46.1 | 59.8 | 12.8 | 27.3 | 23.6 | 35.2 |
| Bulgaria | 2269 | 20.2 | 51.7 | 28.1 | 10.3 | 16.3 | 73.4 | 72.6 | 8.9 | 18.5 | 23.9 | 35.3 |
| Cyprus | 1983 | 12.5 | 42.9 | 44.6 | 17.0 | 26.0 | 57.0 | 61.2 | 12.8 | 26.0 | 18.3 | 35.1 |
| Czech Rep. | 3963 | 4.4 | 76.9 | 18.7 | 15.0 | 24.1 | 60.9 | 78.3 | 11.4 | 10.3 | 14.5 | 35.2 |
| Germany | 5004 | 6.2 | 55.6 | 38.2 | 29.8 | 22.6 | 47.6 | 60.2 | 24.6 | 15.2 | 19.5 | 35.9 |
| Denmark | 2659 | 11.0 | 46.7 | 42.3 | 22.6 | 29.3 | 48.0 | 58.9 | 15.2 | 25.9 | 25.7 | 35.5 |
| Estonia | 2281 | 8.0 | 44.9 | 47.1 | 14.7 | 25.5 | 59.8 | 58.4 | 11.4 | 30.2 | 21.4 | 34.8 |
| Spain | 5690 | 33.7 | 25.7 | 40.6 | 26.0 | 26.6 | 47.5 | 57.2 | 15.9 | 26.9 | 21.9 | 36.2 |
| Finland | 4463 | 6.1 | 39.7 | 54.2 | 31.3 | 27.6 | 41.1 | 56.3 | 13.1 | 30.6 | 24.8 | 34.8 |
| France | 4805 | 13.2 | 43.6 | 43.2 | 20.5 | 34.4 | 45.1 | 57.8 | 15.0 | 27.2 | 24.9 | 34.8 |
| Greece | 2578 | 25.0 | 46.9 | 28.1 | 13.9 | 25.6 | 60.5 | 63.7 | 14.3 | 21.9 | 17.6 | 36.4 |
| Hungary | 4595 | 14.2 | 60.2 | 25.5 | 14.9 | 20.4 | 64.7 | 68.5 | 13.3 | 18.2 | 23.4 | 35.4 |
| Island | 1648 | 19.4 | 35.2 | 45.4 | 14.9 | 35.6 | 49.4 | 50.8 | 18.1 | 31.1 | 23.0 | 35.0 |
| Italy | 8343 | 37.0 | 46.5 | 16.5 | 19.3 | 27.9 | 52.8 | 58.9 | 15.1 | 26.0 | 16.3 | 36.5 |
| Lithuania | 1711 | 5.9 | 49.9 | 44.2 | 10.4 | 22.9 | 66.7 | 64.7 | 10.2 | 25.1 | 30.4 | 35.4 |
| Luxembourg | 2936 | 29.9 | 35.1 | 35.1 | 23.1 | 28.1 | 48.9 | 65.2 | 15.3 | 19.5 | 19.6 | 35.8 |
| Latvia | 1823 | 10.4 | 53.8 | 35.8 | 12.4 | 22.3 | 65.3 | 60.1 | 11.0 | 28.9 | 29.5 | 35.0 |
| Netherlands | 5143 | 15.9 | 46.0 | 38.1 | 25.0 | 31.4 | 43.5 | 53.9 | 21.8 | 24.3 | 17.1 | 35.8 |
| Norway | 2542 | 14.4 | 36.9 | 48.7 | 18.5 | 29.1 | 52.4 | 53.9 | 18.4 | 27.7 | 18.6 | 35.9 |
| Poland | 6494 | 5.4 | 62.9 | 31.7 | 13.0 | 24.3 | 62.7 | 74.5 | 8.0 | 17.4 | 24.1 | 35.0 |
| Portugal | 1960 | 58.5 | 21.4 | 20.1 | 14.1 | 22.3 | 63.6 | 68.6 | 8.2 | 23.2 | 25.1 | 35.9 |
| Romania | 3351 | 23.3 | 61.1 | 15.7 | 15.5 | 13.9 | 70.5 | 75.9 | 16.0 | 8.1 | 17.3 | 35.3 |
| Sweden | 3326 | 5.5 | 46.8 | 47.7 | 18.7 | 36.2 | 45.1 | 61.5 | 12.0 | 26.5 | 23.0 | 35.2 |
| Slovenia | 4822 | 12.5 | 56.1 | 31.4 | 10.2 | 24.5 | 65.2 | 60.3 | 13.8 | 25.8 | 33.9 | 36.2 |
| Slovakia | 2455 | 2.1 | 73.5 | 24.4 | 10.8 | 16.5 | 72.7 | 77.5 | 9.8 | 12.7 | 18.2 | 36.1 |
| UK | 3126 | 6.1 | 53.3 | 40.7 | 27.8 | 28.2 | 44.0 | 66.6 | 12.9 | 20.4 | 21.0 | 35.4 |

Source: EU-SILC 2007 and 2011, own calculations, sample weights used for calculation of distributions, 2007 and 2011 data pooled.

4 Results

4.1 Descriptive findings

Table 2 shows how women in the study sample are distributed by educational pairing and survey year, all countries combined. In both years, educationally homogamous couples form the majority of the sample. Hypogamous couples (below the diagonal) are more common than hypergamous couples (above the diagonal). The proportion of highly educated, homogamous couples increases between 2007 and 2011 as well as the proportion of hypogamous partnerships where the woman is highly educated. This corresponds to the new gender gap in education and confirms the pattern reported in Esteve, García-Román and Permanyer (2012). The table also demonstrates that matches between college educated and people with just primary education are rare, but if they happen, it is more common that she rather than he has the college degree. As can be seen in Table 1, homogamy dominates in all countries, with always more than half of the couples in this category, with hypogamy rather than the traditional hypergamy coming next in all countries except Austria, Germany, the Czech Republic, and Romania.

Table 2: Proportion of couples by educational attainment in the sample, %

| | 2007 | | | 2011 | | |
|-------------------|---------------------|--------|------|------|--------|------|
| | Partner's education | | | | | |
| | Low | Medium | High | Low | Medium | High |
| Woman's education | | | | | | |
| Low | 10.9 | 6.3 | 1.1 | 9.0 | 5.1 | 1.1 |
| Medium | 7.1 | 34.6 | 8.9 | 7.0 | 31.7 | 8.8 |
| High | 1.9 | 10.8 | 18.2 | 2.3 | 13.3 | 21.7 |

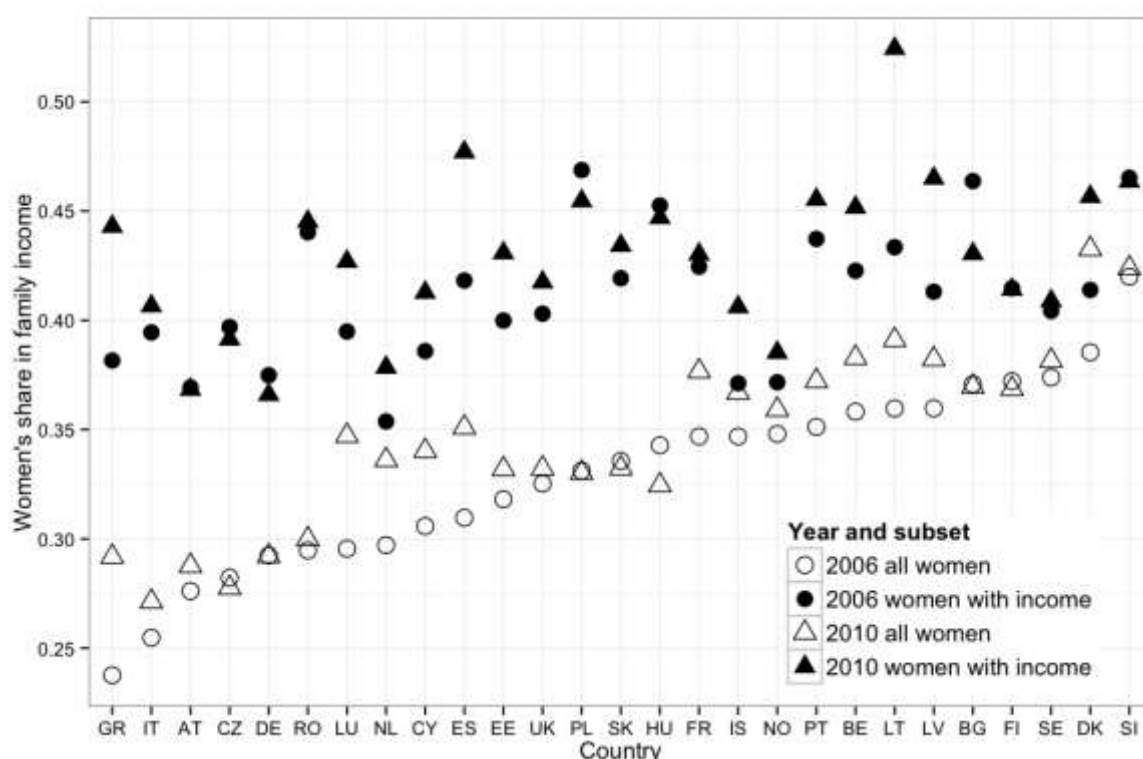
Note: cell percentages by survey year.

Source: EU-SILC 2007 and 2011, own calculations, sample weights.

In tandem with the shifting patterns of educational pairings, the average contribution of women to the couple income has changed as well. In the pooled sample, women's share increased from 0.31 to 0.33 between 2006 and 2010; the proportion of women earning more than half of the income went up from 0.20 to 0.22. There is a clear correlation across countries between the proportion of hypogamous couples and the proportion of breadwinner women: the correlation coefficient between the two relevant columns of Table 1 is 0.48, indicating that almost a quarter of the variance of the proportion of female breadwinners is covered by the proportion of couples where she has more education than he.

Figure 2 shows country differences in women's share in the couple income for the two survey years. An additional layer of results is for a subsample that excludes women who do not earn any income. Focusing on the full sample, there is large variation in women's share, ranging from less than 30% to over 40% of the total couple income. In 2006, women's share was largest in Slovenia. In 2010 Denmark popped up a bit higher. The women's share tends to be lowest in Italy, Greece, Austria, and Germany. These are four countries with a relatively strong male breadwinner – female homemaker family model. If only couples where the wife earned at least some income are considered, the average women's share increases in all countries, but particularly in countries that show a low share in the total sample. As a result, the country gradient in the second series (filled black circles and triangles in Figure 2) is clearly smaller.

Figure 2: The average women's share in couple income by country, year and income earning status



Source: EU-SILC 2007 and 2011, own calculations, sample weights.

Figure 2 also shows how the average women's share has changed between the two survey years. In most countries, there was no notable increase. Exceptions include countries that were hit badly by the post 2008 economic crisis, notably Greece, Spain, Latvia, and Lithuania, where unemployment rates soared. Men's employment was more affected by the

economic crisis than women's (Hijman 2009), so we speculate that, in these countries, rising male unemployment was one of the drivers behind women's increasing share.

Table 3 shows that this shift did not happen in all educational pairings. The most notable increase occurred where the man was low educated, particularly for the low educated homogamous couples. There is not so much change for couples in which both are secondary or tertiary educated, or where a highly educated woman is partnered to a secondary educated man.

Table 3: Woman's average share in couple income

| | 2006 | | | 2010 | | |
|-------------------|---------------------|--------|------|------|--------|------|
| | Partner's education | | | | | |
| | Low | Medium | High | Low | Medium | High |
| Woman's education | | | | | | |
| Low | 0.23 | 0.21 | 0.22 | 0.26 | 0.22 | 0.24 |
| Medium | 0.31 | 0.31 | 0.26 | 0.32 | 0.31 | 0.26 |
| High | 0.41 | 0.42 | 0.36 | 0.43 | 0.42 | 0.37 |

Source: EU-SILC 2007 and 2011, own calculations, sample weights.

Table 4 presents the categorical distributions of women according to breadwinner status by country as well as motherhood status. For women without children in the household, the proportion being completely dependent on the men's income ranges from 6.6% in Iceland to 27.4% in Greece. In all countries, the presence of young children drive up the proportion of financially dependent women, particularly young children up to age 3, but there are large country differences. For example, in Denmark, the Netherlands, Portugal, and Slovenia less than one fifth of all women with young children is in the dependent category. At other end, the proportion is clearly much higher in Czech Republic, Hungary, and Slovakia. As the age of the youngest child goes up, the proportion of financially dependent women goes down again. In all countries except Greece and Italy, the modal relative income category for women with children above age 3 is the one of contributing 11 to 50% of the couple income. For childless women, this is by far the modal category in all countries. In some countries, the proportion of wives contributing 11 to 50% is also very high for those with children aged 0 to 3: more than 6 out of 10 women with toddlers are in the contributing category in Denmark, the Netherlands, Norway, Sweden, and Slovenia. Although their share in the couple income can be as low as 11%, it suggests a relatively quick return to at least some employment after childbirth in these countries.

Breadwinner women, earning more than half of the couple income, are most common among the childless. In Lithuania, Latvia, and Slovenia, more than 40% of childless women

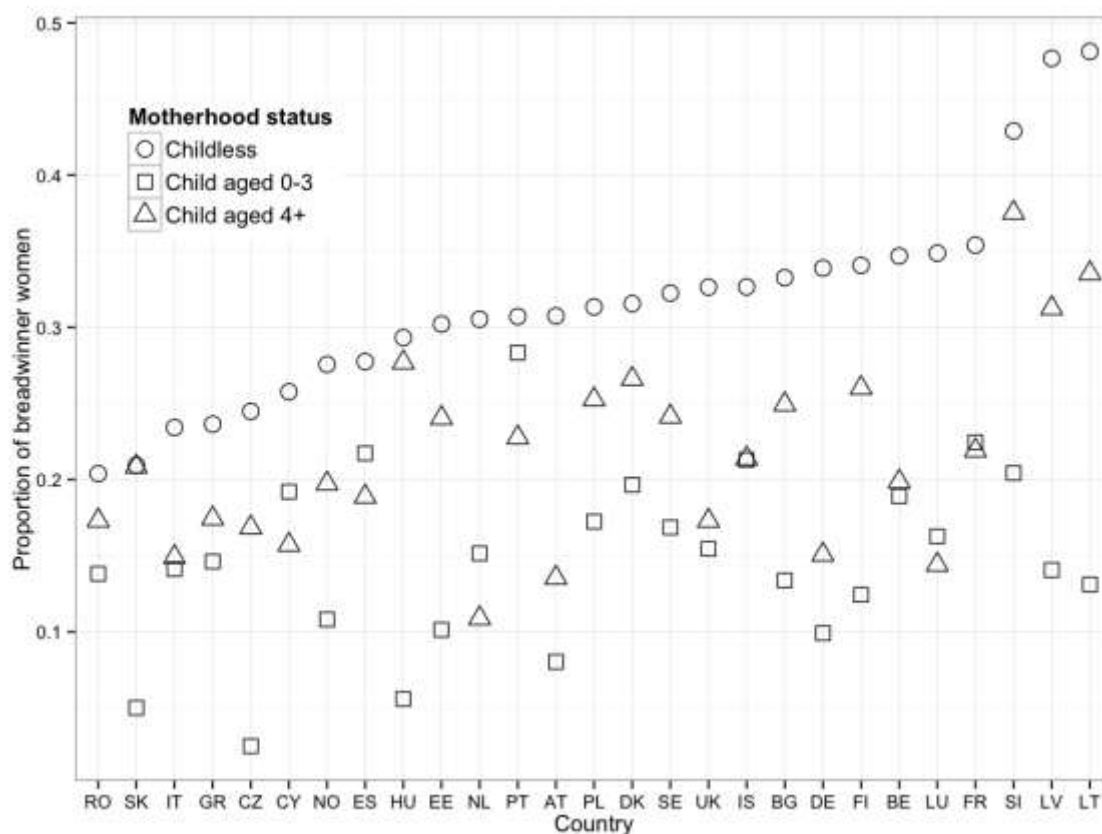
are main breadwinners (Figure 3). They are least common among those with toddlers (the squares in Figure 3). Still, at least one in five mothers with toddlers is the main breadwinners of her household in Spain, France, Iceland, and Portugal. Among women with children above age 3, the proportion of breadwinners is in between.

Table 4: Distribution of woman's categorical income share by country and motherhood status, %

| | Childless | | | | Youngest child aged 0-3 | | | | Youngest child aged 4+ | | | |
|-----------|-----------|-------|-------|--------|-------------------------|-------|-------|--------|------------------------|-------|-------|--------|
| | 0-10 | 11-50 | 51-90 | 91-100 | 0-10 | 11-50 | 51-90 | 91-100 | 0-10 | 11-50 | 51-90 | 91-100 |
| AT | 11.2 | 58.1 | 26.2 | 4.5 | 59.8 | 32.2 | 6.6 | 1.4 | 25.5 | 61.0 | 9.7 | 3.8 |
| BE | 11.7 | 53.7 | 27.7 | 7.0 | 23.5 | 57.6 | 14.8 | 4.1 | 17.6 | 62.5 | 17.0 | 2.9 |
| BG | 15.3 | 51.5 | 26.2 | 7.0 | 36.8 | 49.8 | 10.6 | 2.8 | 16.9 | 58.1 | 18.3 | 6.6 |
| CY | 11.6 | 62.7 | 22.8 | 3.0 | 25.0 | 55.8 | 19.0 | 0.2 | 21.8 | 62.4 | 14.7 | 1.0 |
| CZ | 8.6 | 66.9 | 22.4 | 2.1 | 77.4 | 20.1 | 2.0 | 0.5 | 20.2 | 62.9 | 14.4 | 2.5 |
| DE | 12.5 | 53.6 | 28.4 | 5.5 | 51.3 | 38.8 | 6.9 | 3.0 | 35.2 | 49.7 | 10.5 | 4.6 |
| DK | 12.1 | 56.4 | 27.9 | 3.7 | 14.4 | 65.9 | 16.7 | 3.0 | 6.7 | 66.7 | 22.0 | 4.6 |
| EE | 10.5 | 59.3 | 25.9 | 4.3 | 59.5 | 30.4 | 4.8 | 5.3 | 17.1 | 58.8 | 18.1 | 6.0 |
| ES | 19.9 | 52.3 | 21.3 | 6.5 | 31.4 | 46.8 | 16.1 | 5.6 | 34.4 | 46.8 | 12.3 | 6.6 |
| FI | 9.3 | 56.6 | 28.5 | 5.6 | 37.1 | 50.5 | 10.4 | 2.0 | 10.5 | 63.5 | 21.7 | 4.3 |
| FR | 9.2 | 55.4 | 29.2 | 6.2 | 28.4 | 49.2 | 20.3 | 2.2 | 20.2 | 57.9 | 17.9 | 4.0 |
| GR | 27.4 | 49.0 | 19.3 | 4.3 | 42.2 | 43.2 | 11.7 | 2.9 | 45.0 | 37.6 | 13.9 | 3.5 |
| HU | 8.1 | 62.6 | 25.2 | 4.1 | 74.7 | 19.7 | 3.9 | 1.7 | 20.1 | 52.2 | 21.1 | 6.6 |
| IS | 6.6 | 60.8 | 28.9 | 3.8 | 25.0 | 53.7 | 18.5 | 2.8 | 10.9 | 67.7 | 19.4 | 1.9 |
| IT | 21.4 | 55.2 | 20.4 | 3.0 | 36.1 | 49.7 | 12.6 | 1.5 | 44.6 | 40.5 | 11.5 | 3.4 |
| LT | 13.0 | 38.9 | 41.2 | 7.0 | 50.0 | 36.9 | 12.1 | 1.0 | 18.5 | 47.9 | 24.2 | 9.3 |
| LU | 8.1 | 57.0 | 27.0 | 7.8 | 31.0 | 52.7 | 13.1 | 3.1 | 31.0 | 54.6 | 11.2 | 3.2 |
| LV | 14.8 | 37.6 | 40.1 | 7.6 | 44.5 | 41.4 | 12.0 | 2.0 | 15.7 | 53.1 | 24.0 | 7.2 |
| NL | 9.0 | 60.5 | 26.6 | 3.9 | 18.7 | 66.2 | 13.7 | 1.4 | 28.2 | 60.9 | 8.5 | 2.4 |
| NO | 9.7 | 62.8 | 24.6 | 3.0 | 23.4 | 65.8 | 9.0 | 1.8 | 10.0 | 70.3 | 16.2 | 3.6 |
| PL | 16.4 | 52.3 | 25.3 | 6.0 | 41.6 | 41.2 | 13.3 | 4.0 | 31.0 | 43.7 | 17.8 | 7.5 |
| PT | 15.4 | 53.9 | 26.7 | 4.0 | 19.0 | 52.7 | 26.0 | 2.3 | 24.3 | 52.9 | 17.6 | 5.2 |
| RO | 20.3 | 59.3 | 16.7 | 3.7 | 59.7 | 26.5 | 10.1 | 3.7 | 34.8 | 47.9 | 13.3 | 4.0 |
| SE | 9.6 | 58.1 | 26.5 | 5.7 | 22.0 | 61.1 | 13.8 | 3.1 | 9.1 | 66.8 | 20.3 | 3.9 |
| SI | 9.2 | 47.9 | 35.5 | 7.4 | 18.2 | 61.4 | 17.0 | 3.5 | 11.1 | 51.4 | 32.6 | 4.9 |
| SK | 10.8 | 68.2 | 18.2 | 2.7 | 74.4 | 20.6 | 3.2 | 1.8 | 16.3 | 62.8 | 16.2 | 4.6 |
| UK | 8.9 | 58.4 | 27.8 | 4.9 | 35.6 | 49.0 | 11.9 | 3.5 | 26.0 | 56.7 | 12.8 | 4.5 |

Source: EU-SILC 2007 and 2011, own calculations, sample weights, 2007 and 2011 data pooled.

Figure 3: Proportion of women being the main breadwinner by country and motherhood status



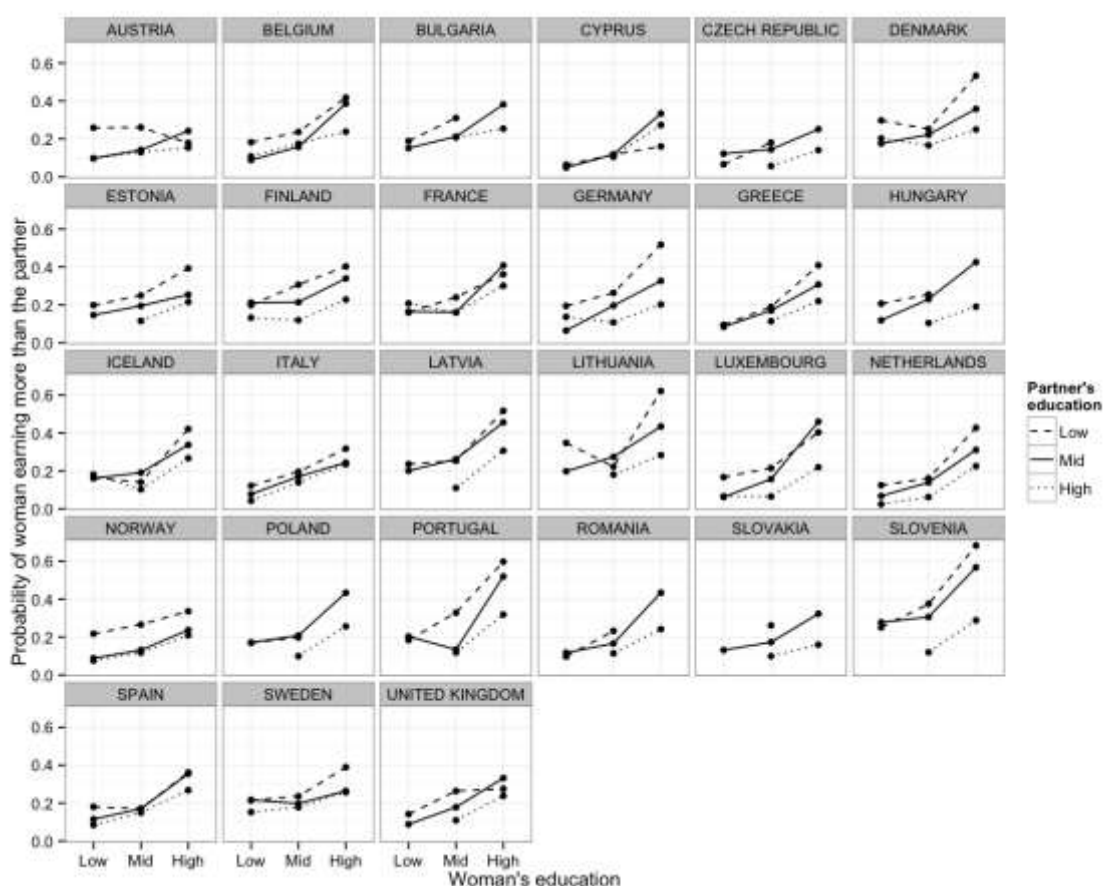
Source: EU-SILC 2007 and 2011, own estimation, sample weights, 2007 and 2011 data pooled.

Figure 4 displays the proportion of women who are main breadwinners by country and combinations of her and her partner's education. Educational pairings that were represented by less than 20 observations in the sample are excluded from the graph. As should be expected, the woman's education is clearly positively related to her share in the couple income in all countries. In some countries (e.g., the Netherlands, Romania) the gap between medium and highly educated women's average share is much larger than in others (e.g., Slovakia, Sweden). Her partner's education, on the other hand, is negatively related to her share: the higher his education, the lower her share in the income, all else equal. This is most clearly visible in the case of Germany, Hungary, Luxembourg and several others, where higher education of the partner lowers women's share noticeably. Across the board, it clearly matters for college educated women in particular whether she is in a homogamous or hypogamous relationship: in case of hypogamy, the proportion of female breadwinners is higher in all countries. There are clearly differences between countries, but the basic pattern is very general. We now turn to regression analysis to find out whether this still holds when motherhood status is also taken into account.

4.2 Model results

Table 5 shows the estimates for the multilevel multinomial logistic model. The dependent variable has three categories: she earns at most 10% of the couple income (“dependent”), she earns more than 50% of it (“breadwinner”), or she earns between 11 and 50% of it (“contributing”). The latter category is the reference category, so the left block of coefficients refer to the probability to be dependent on the husband rather than contributing and the right hand block refers to the probability to be the main breadwinner, rather than contributing less than half.

Figure 4: Proportion of women being the main breadwinner by country and her and his education



Note: shown only for combinations with at least 20 observations.

Source: EU-SILC 2007 and 2011, own calculations, sample weights, 2007 and 2011 data pooled.

Apart from the controls for age, survey year, and the partner’s employment situation (at the bottom of the table), the model includes an interaction between educational pairing and motherhood status. The first horizontal block in the table gives the estimated effects of motherhood status when both she and he are medium educated (i.e., the reference category for

educational pairing) and the effects of educational pairings for couples who have children above age 3 (i.e., the reference category). The blocks of coefficients below that are estimates for the interactions between educational pairing and being childless or having a child below age 4, respectively. Next are the fixed effects for the control variables. The bottom of the table gives the country level variance and covariance components of the multilevel model.

The model clearly shows that female educational hypogamy increases the odds that a woman is the main breadwinner and decreases the odds that she is financially dependent on her partner. The educational gradient as such works in the same direction, but the pattern of educational pairing adds to that. First, looking at homogamous couples, women in low educated couples are more likely to be dependent on him and less likely to earn most of the income, on average across countries, than the reference category of medium educated couples. Conversely, in highly educated couples, she is less often dependent on him while she is more often the main breadwinner than in medium educated couples. This holds irrespective of motherhood status. Second, hypogamy reinforces this effect for women: if she is highly educated but not he, she is more likely to be the main breadwinner than in homogamous couples with college education. Again, this holds both for the childless and for women with children. While educational pairing significantly affects the likelihood that she is the main breadwinner, the likelihood that she is dependent on him is only affected by her education, with hardly any additional effect of how this compares to his education. The main effects of educational pairing are on the likelihood of breadwinning.

Table 5: Multinomial random effects logistic regression of women's share in couple income

| | Income share 0-10 | | | | Income share 51-100 | | | |
|--|-------------------|-------|--------|--------|---------------------|-------|--------|--------|
| | Coef. | p | L95 | U95 | Coef. | p | L95 | U95 |
| Childless | -0.657 | 0.000 | -0.757 | -0.558 | 0.487 | 0.000 | 0.404 | 0.570 |
| Youngest child aged 0-3 | 0.998 | 0.000 | 0.935 | 1.061 | -0.260 | 0.000 | -0.353 | -0.167 |
| Youngest child aged 4+ | ref | ref | ref | ref | ref | ref | ref | ref |
| Her – His education: | | | | | | | | |
| Low – Low | 1.042 | 0.000 | 0.971 | 1.112 | -0.198 | 0.000 | -0.291 | -0.105 |
| Low – Medium | 0.823 | 0.000 | 0.746 | 0.900 | -0.337 | 0.000 | -0.445 | -0.228 |
| Low – High | 1.156 | 0.000 | 0.968 | 1.344 | -0.382 | 0.018 | -0.699 | -0.066 |
| Medium – Low | 0.429 | 0.000 | 0.346 | 0.512 | 0.289 | 0.000 | 0.199 | 0.379 |
| Medium – Medium | ref | ref | ref | ref | ref | ref | ref | ref |
| Medium – High | 0.166 | 0.000 | 0.086 | 0.247 | -0.555 | 0.000 | -0.667 | -0.443 |
| High – Low | 0.085 | 0.399 | -0.113 | 0.284 | 1.088 | 0.000 | 0.936 | 1.241 |
| High - Medium | -0.531 | 0.000 | -0.627 | -0.435 | 0.944 | 0.000 | 0.876 | 1.012 |
| High - High | -0.506 | 0.000 | -0.584 | -0.428 | 0.204 | 0.000 | 0.135 | 0.273 |
| Interaction terms: | | | | | | | | |
| Childless X Her – His education: | | | | | | | | |
| Low-Low | 0.150 | 0.123 | -0.041 | 0.341 | -0.159 | 0.151 | -0.376 | 0.058 |
| Low-Medium | 0.236 | 0.031 | 0.022 | 0.450 | -0.268 | 0.045 | -0.531 | -0.006 |
| Low-High | -0.105 | 0.638 | -0.541 | 0.332 | -0.028 | 0.922 | -0.591 | 0.535 |
| Medium-Low | 0.197 | 0.073 | -0.018 | 0.412 | -0.237 | 0.018 | -0.434 | -0.041 |
| Medium-High | 0.018 | 0.857 | -0.181 | 0.217 | 0.239 | 0.017 | 0.042 | 0.435 |
| High-Low | 0.569 | 0.004 | 0.185 | 0.953 | -0.035 | 0.804 | -0.309 | 0.240 |
| High-Medium | 0.386 | 0.000 | 0.184 | 0.587 | -0.202 | 0.002 | -0.333 | -0.071 |
| High-High | 0.138 | 0.108 | -0.030 | 0.306 | 0.113 | 0.067 | -0.008 | 0.234 |
| Youngest child aged 0-3 X Her – His education: | | | | | | | | |
| Low - Low | -0.542 | 0.000 | -0.676 | -0.408 | 0.185 | 0.090 | -0.029 | 0.398 |
| Low - Medium | -0.301 | 0.000 | -0.456 | -0.146 | 0.315 | 0.019 | 0.052 | 0.579 |
| Low - High | -0.791 | 0.000 | -1.140 | -0.442 | 0.247 | 0.435 | -0.372 | 0.865 |
| Medium - Low | -0.434 | 0.000 | -0.576 | -0.292 | -0.024 | 0.808 | -0.216 | 0.168 |
| Medium - High | -0.252 | 0.000 | -0.387 | -0.117 | 0.301 | 0.009 | 0.076 | 0.525 |
| High - Low | -0.605 | 0.000 | -0.902 | -0.309 | 0.127 | 0.344 | -0.136 | 0.391 |
| High - Medium | -0.080 | 0.248 | -0.216 | 0.056 | -0.104 | 0.132 | -0.239 | 0.031 |
| High - High | -0.176 | 0.002 | -0.287 | -0.065 | 0.238 | 0.000 | 0.109 | 0.367 |
| Age >= 35 | -0.090 | 0.000 | -0.127 | -0.053 | 0.274 | 0.000 | 0.232 | 0.316 |
| Year 2010 | -0.028 | 0.091 | -0.061 | 0.005 | -0.015 | 0.393 | -0.051 | 0.020 |
| Partner's unemployment > 0 | 0.495 | 0.000 | 0.419 | 0.572 | 1.425 | 0.000 | 1.356 | 1.495 |
| Partner's hours > 40 | 0.196 | 0.000 | 0.160 | 0.231 | -0.143 | 0.000 | -0.184 | -0.102 |
| Partner's hours info missing | 0.499 | 0.000 | 0.421 | 0.577 | 1.659 | 0.000 | 1.591 | 1.726 |
| Intercept | -1.135 | 0.000 | -1.229 | -1.040 | -1.545 | 0.000 | -1.616 | -1.473 |
| Intercept var. (SE) | 0.320 (0.039) | | | | 0.176 (0.019) | | | |
| cov (SE) “51-100”, “0-10”: | -0.009 (0.0140) | | | | | | | |
| cor “51-100”, “0-10”: | -0.0037 | | | | | | | |

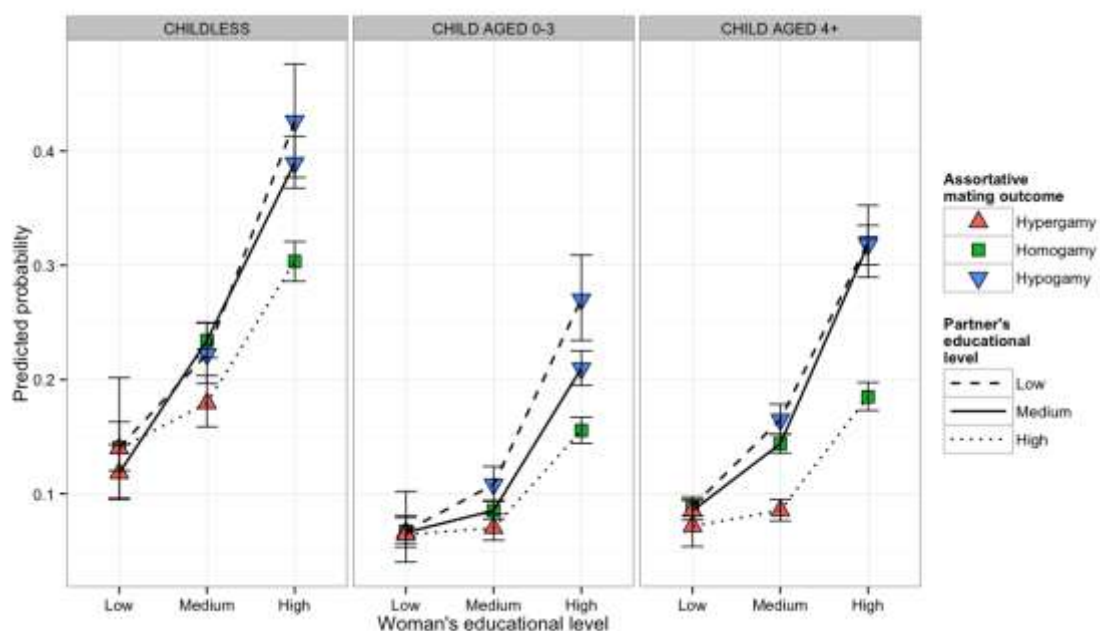
Source: EU-SILC 2007 and 2011, own calculations.

The differences in breadwinning between highly educated women in homogamous versus hypogamous unions are all statistically significant, as can be judged from the confidence intervals in Table 5 as well as in Figure 5. Figure 5 plots the predicted probability that the wife is the main breadwinner by both his and her education and by motherhood status (and other covariates fixed at their model reference categories). The gap between homogamous and hypogamous unions is widest when there are children over age 3 in the

household. For highly educated, hypogamous women with children over age 3, the predicted probability to be the main breadwinner is over 0.3, which is about the same level as the predicted probability for highly educated, homogamous couples without children. Highly educated women who are in a homogamous union are significantly less likely to be the main breadwinner.

For medium educated women with children, the results point in a similar direction: hypogamous women are more likely and hypergamous women less likely to be the main breadwinner. The differences are statistically significant for those with children but not for the childless. For low educated women, there are no significant differences by educational attainment of the partner. Low educated women are least likely to be the main breadwinner and most likely to be financially dependent on their partners, irrespective of his education.

Figure 5: Model predicted probability that she is the main breadwinner by educational pairing and motherhood status



Note: simulation-based 95% confidence intervals retrieved from 4000 repetitions and represent the 2.5th and 97.5th percentile values of the simulated distribution.
Source: Model reported in Table 5.

Motherhood and age of the youngest child have effects in line with expectations. When the educational pairing is held at its reference category (both medium educated), childlessness has a significant negative effect on the odds that the wife is financially dependent on her partner, and a positive effect on being the breadwinner, compared to mothers whose youngest child is four years or older. Having a child younger than four years has the opposite effect: women are more likely to be in the dependent group and less likely to be breadwinners.

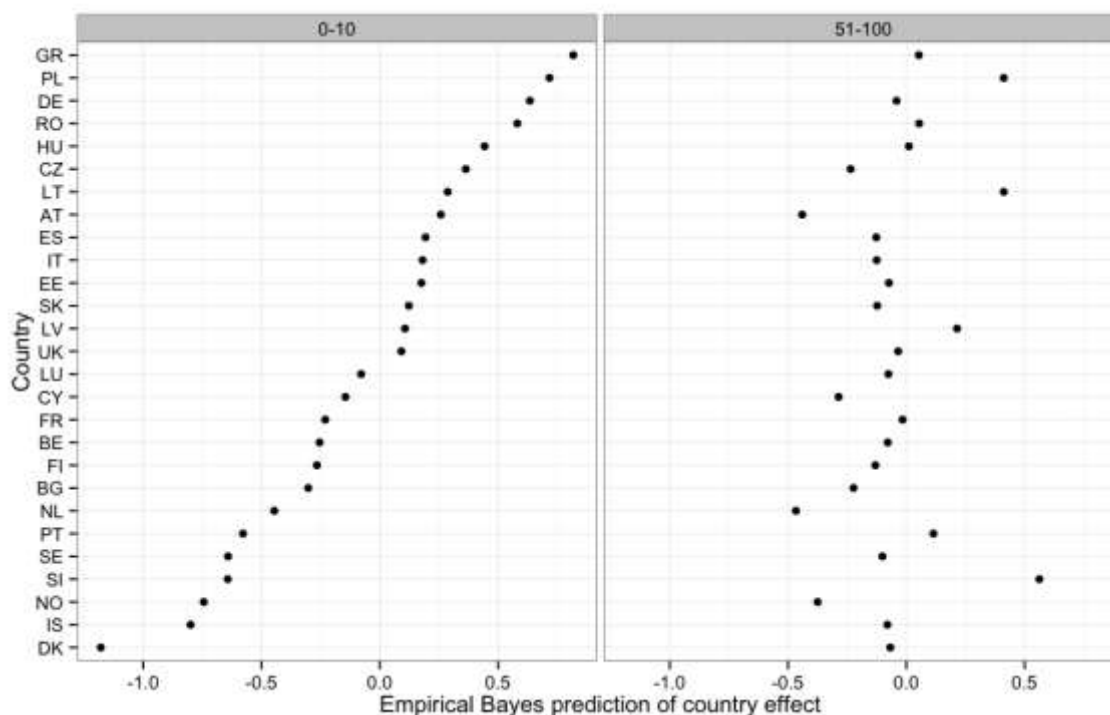
Turning to the control variables, women of age 35 and above are less likely to be dependent on their husband and more likely to be the main breadwinner, net of educational pairing and motherhood status. Most likely, this is picking up the aging of children, if any. The higher the number of working hours of the male partner in the labor market, the more likely that she depends on him and less likely she is the breadwinner. Unexpectedly, (temporary) unemployment of the partner has not just a positive effect on the probability that she is the breadwinner but also on the probability that she financially depends on him. We take the latter to indicate that unemployment is to some extent clustered within vulnerable couples, such that his unemployment is correlated positively with her unemployment. The year of the income data (namely 2010, so after the 2008 financial crisis got started) has no statistically significant overall effect, in this model. However, from models estimated but not reported here, we know that the likelihood that she is the main breadwinner increased after 2008 for couples where he is low educated, particularly in countries that were hit badly by the crisis. This is in line with the fact that male unemployment increased more than female unemployment.

Obviously, female financial dependence and breadwinning varies by country. The last block of Table 5 reports the variances of the random intercepts. It appears that the variance for the outcome that a woman is dependent on her husband's income is larger (0.320) than that for being the main breadwinner (0.176). This indicates that among European countries there is higher heterogeneity for the first group. Large variation in the proportion of dependent women is in line with the descriptives in Table 4. The correlation between the two random effects is negligibly small (-0.004), suggesting that there is no association between male breadwinning (with she earning 10% at most) and female breadwinning (with she earning more than half) on the country level. This is also borne out by the empirical Bayes estimates of the country effects, shown in Figure 6. Denmark has the lowest odds of having women in the dependent category, which is in accordance with results from Table 4 that shows Denmark having the lowest proportion of mothers with older children in the "0–10" category. Comparison of country level variation in the odds of dependency and breadwinning suggests that there is no correlation between the prevalence of breadwinner women and the extent to which women participate at all in the paid labor market in that country.

We know that the effect of motherhood varies by country as well. However, we were unable to get estimates of a multinomial model with random slopes for motherhood status. Instead, we estimated a binary logistic model with the probability that she is the main breadwinner as the dependent variable, allowing for random, country specific effects of

motherhood status. The results (not shown here) are consistent with what was reported above. Country differences indicate that the motherhood penalty on relative income tends to be stronger in countries where female breadwinning is, overall, less common. In these countries, childless women tend to be breadwinner significantly more often than on average in their country.

Figure 6: Predicted difference of intercepts from the grand mean, log-odds scale



Source: Model reported in Table 5. Countries ordered by the random intercept of “0-10” category.

5 Conclusion and discussion

The reversal of the gender gap in education represents a major social development, not just in the West but also in many other regions in the world. For the first time in history, women tend to be more highly educated than men, and this is bound to affect the dynamics involved in human reproduction, including union formation and fertility (Van Bavel 2012). An earlier study has shown that the traditional patterns of hypergamy, where women marry men who are at least as highly educated as themselves, has made way for a new pattern of hypogamy: in many Western and non-Western countries, it has become more common that she has more education than he rather than the other way around (Esteve, García-Román, and Permanyer 2012).

The aim of this paper was to find out whether the emerging pattern of hypogamy is associated with a higher proportion of couples where she earns more than half of the income. If women would be the main breadwinner more often, it would affect the household economic calculus behind allocating paid and unpaid work and childbearing decisions through the opportunity costs of staying at home for child care and household chores. However, the reversal of the gender gap in education need not necessarily translate into more female breadwinners, since the connection between the level of education and earnings in the labor market is not straightforward. While women have caught up and even surpassed men in education a while ago, such is not the case in the labor market. Men still exhibit higher activity rates in paid work and earn higher wages, so the gender pay gap remains to the disadvantage of women. The literature mentions several reasons for this, including the fact that women often retreat from paid labor upon childbirth (“the motherhood penalty”) and the fact that women tend to choose study subjects in college that yield lower salaries in their careers.

Our multilevel analysis of European couples based on EU-SILC data for 2007 and 2011 shows that hypogamy positively affects the probability that she earns more than half of the couple income. Highly educated women are much (at least 10 percentage points) more likely to be the main breadwinner than medium or low educated women, but this is particularly the case when their partners have medium or lower educational attainment. Irrespective of motherhood status, highly educated women in a homogamous union are significantly less likely to be the breadwinner than hypogamous peers. Looking at the interaction with motherhood status, we found evidence that hypogamy is offsetting the motherhood penalty: college educated women in a hypogamous union with school aged children are as likely to be the main breadwinner as childless college graduates in a homogamous union.

For low educated women, there are no significant differences by the educational attainment of the partner. They are least likely to be the main breadwinner and most likely to be financially dependent on their partners, irrespective of his education. For medium educated women, partners’ education does matter, but not as much as for college graduates: they are more likely to be the main breadwinners in case of hypogamy, but the differences in the effect of partner’s education are smaller.

While educational pairing significantly affects female breadwinning, we do not find evidence that it also affects the likelihood that she depends on his income. Female dependence is strongly driven by her own education, with low educated women being much more often dependent on him, but there is hardly an additional effect of how this compares to his

education. In general, the gap in breadwinning status between low (primary) and medium (secondary) educated women is smaller than the gap between medium and highly (tertiary) educated women.

All these results represent the overall pattern, on average across countries, as represented by the fixed part of the mixed effects multilevel model. Of course, there is a lot of country heterogeneity. Our calculations indicate that, on the country level, the proportion of women earning more than half of the family income varies between 20% and almost 50% for childless women and between 3 and 25% for women with toddlers. Inspection of the country level random effects indicates that our model leaves particularly large country level variance unexplained with respect to the proportion of women who are financially dependent on their husbands. The residual, country level variance with respect to the proportion of female breadwinners is only about half of the unexplained variance in the proportion of dependent women. We also found that there is hardly a correlation between the random country effects on female dependency and female breadwinning. This is in line with our conclusion that educational pairings affect the likelihood of female breadwinning much more than the likelihood of female dependence. We speculate that the latter is much more a function of cultural beliefs and norms about gender roles, which were not empirically addressed in this paper. Addressing these cultural differences in a future study may also shed more light on the role played by gender role attitudes of low versus high educated women and their partners.

Furthermore, there are also strong country differences in the motherhood penalty. Partly, these can be explained by country differences in educational assortative mating, as discussed above (with hypogamy having a diminishing effect on the motherhood penalty). Yet, large country variety in the motherhood penalty remains unexplained. Again, we speculate that this is related to cultural differences between countries as well as to the different family policies (reflecting these cultural differences to a large extent) that may or may not facilitate labor market activity for mothers. Addressing these country differences with empirical indicators remains work to do in future studies.

The same holds for estimating the effect of the post 2008 economic crisis. We have combined data about the situation before and after the crisis in order to make sure that our results for educational pairings are robust against this major economic shock, but we have not attempted to estimate the effect of that shock itself. We found that our conclusions about the effect of educational pairing on breadwinning hold both before and after 2008. While the survey year (2007 versus 2011) had no overall significant effect in our model, additional checks showed that the proportion of female breadwinners increased after 2008 for couples

who were low educated, particularly in countries that were hit badly by the crisis. Most likely, this is related to high male unemployment, for example in heavy industry, while women in these countries often had more stable jobs, for example as teachers, doctors, or other jobs in the public sector. Future research should address the effects of the economic crisis on male and female breadwinning more in detail. A future study should also look at the persistence of female breadwinning in the life course of couples, on top of addressing the persistence of it over cohorts and historical time.

Continuing on the limitations of this study, we have only addressed the role played by level of educational attainment, not the role played by field of education. The field of study clearly has a strong connection to the options in terms of occupation and, hence, to the earning potential in the labor market. Field of study has also been shown to be related to both the transition to motherhood, the earning potential, as well as to attitudes about gender roles (Van Bavel 2010). Choice of study disciplines along gender-stereotypical lines might explain why men remain the main breadwinner in the majority of cases, even in hypogamous couples.

The estimates we presented in this paper of the effects of educational pairings on women's share in the family income should not be interpreted as pure causal effects. One of the reasons to be cautious about this is that the selection into union and divorce risks are likely to be correlated to woman's income and educational level, with variation from country to country. For instance, it could be argued that well-educated and high income earning women are more or rather less likely to marry, depending on the country context (e.g. due to lack of highly educated partners), and more likely to dissolve existing partnership due to higher individual economic security, or not (and this may change over time within a given country, like the US, see Schwartz and Han 2014). Similarly, women in partnership may give up employment and remain full-time homemakers after childbirth, whereas this is less likely to happen with single mothers. It is therefore reasonable to expect that the estimation of woman's share in couple income will be downward biased compared to a hypothetical situation where all women would be partnered.

Nevertheless, the main finding of this paper is a very robust one: the growing pattern of female educational hypogamy is associated with a higher proportion of women who earn more than half of the family income. We speculate that this will strongly interfere with the traditional household calculus of decision making about childbearing since it affects the opportunity costs of retreating from the paid labor market to provide childcare and to do household chores. Even though many tasks may be outsourced, it will still affect power relationships between men and women sharing costs and income in their households. In the

past, women generally had less power in the couple than men because they earned less income. Women's power was further reduced because their options after potential union dissolution were limited due to their specialization in unpaid household labor (England 2010). Because men had more power than women, men have been more able to resist doing household labor when they do not want to do it, whereas women had to give in even if they disliked the same tasks in the household (Poortman and van der Lippe 2009). These things may be different in households where she is the main breadwinner.

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